

COMPOSITE METALWOOD

This application is a continuation-in-part of the US Application filed on December 2, 2003 which as of date has an unknown serial number, but which is identified by the title Golf Club Head and Manufacturing Method Thereof, having inventors Kenji Onoda, Katsuyuki Aizawa, and Philip Chuang which claimed priority from Japanese patent application 2002-349443, filed December 2, 2002. This application also claims priority from Japanese patent application numbers 2003-020349, 2003-020348, and 2003-020347, all filed on July 14, 2003.

This invention relates to a golf club commonly referred to as a metalwood such as a driver or fairway club which includes a composite component and more particularly relates to a metalwood utilizing a joint member for interconnecting a non-metallic portion of a metalwood to a metallic portion of a metalwood.

BACKGROUND OF THE INVENTION

There is a constant quest for golf club designers to manipulate the center of gravity of golf clubs depending on the skill of the golfer, and also to manipulate the club's moment of inertia which helps prevent twisting of the golf club. For drivers in particular, there has been a trend to develop larger golf club heads. Since it is customary for drivers to weigh approximately two hundred grams, the enlargement of drivers has been accomplished by utilizing lightweight materials such as titanium, and also to substitute metallic components with composite components.

However, certain problems may arise when composite components are utilized in combination with metallic components. For instance, US publication 2003/0083151 discloses a

golf club head of a metalwood variety which includes a metallic portion and a composite portion. While such a design is suitable for its intended purpose, certain improvements may be had. For instance, the composite material may possibly be subject to cracking due to the stresses placed upon it by the golf club face striking a ball. This is due because, when striking a ball repeatedly, vibration due to impact by the striking is generated entirely in the golf club head each time it hits the ball. Thus, because different materials are present in the main body, the differences in the transmission of vibration by the impact, and the amount of deformation in material due to the impact are generated. Consequently, a deviation or gap may be generated in the joining section between the composite and metal members, thereby leading to destruction of the golf club head.

Additional problems exist in that as the club head becomes too large, it may become difficult to square the clubface to the ball at impact as a majority of the weight of the golf club head is moved away from the golf club shaft, which is the point of rotation for the golf club head for striking the golf ball.

Accordingly, it is an object of the present invention to provide a golf club head of the metalwood type which is large but also which is easy to square upon impact.

It is also an object of the present invention to provide a golf club head of the metalwood type which has a primary head comprised of a first material and a cover of a second material which is unsuitable for welding with the first material integrated in a manner which facilitates the integrity of the bonding between the two dissimilar components, which makes for a more durable and aesthetic metalwood.

SUMMARY OF THE INVENTION

A golf club head having a primary body of a first material defining an opening. A cover of a second material which covers the opening and includes a periphery. The cover being unsuitable for welding with the primary body. A reinforcing edge mask having a first portion bonded to and at least partially covering the periphery of the cover and also having a second portion secured to the primary body.

DESCRIPTION OF THE DRAWING

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The construction designed to carry out the invention will hereinafter be described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

Figure 1 is an exploded view of the composite metalwood of the present invention;

Figure 2 is an exploded view of a joint member utilized with the composite metalwood of the present invention;

Figure 3 illustrates the assembled composite metalwood;

Figure 4 illustrates the integration of the assembled components;

Figure 5 is a sole view of the composite metalwood illustrating a composite component of the toe in addition to the corrugated heel weights;

Figure 6 is a front view of a composite metalwood having a chamfered toe portion; and

Figure 7 is a toe view of the metalwood of the present invention illustrating the chamfered toe portion and composite toe portion.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Now, reference will be made with respect to the drawings for understanding of the preferred embodiment of the invention.

As shown in Figure 1, metalwood A includes a primary head component 10 of a first material and a cover 11 which is of a second material . Preferably, primary head component 10 is metallic comprised of either a cast body, or individual forged components integrated together. Primary head component 10 includes a face portion 12, a crown portion 14, a hosel 16, a heel portion 18, a toe portion 20, and a rear portion 22 which interconnects the toe portion and heel portion. As shown in Figures 2 and 3, reinforcing edge mask 24 interconnects cover 11 with primary head component 10.

As shown in Figure 1, crown portion 14 of primary head component 10 defines a crown opening 26 within the crown portion. Preferably, a recess 28 is defined within the crown portion, providing a seat for cover 11 for covering crown opening 26. Crown portion 14 includes an upper surface defining an upper profile and an intermediary crown portion 30 which junctions the upper surface with recess 28. Preferably, intermediary crown portion 30 is sloped providing a seat for reinforcing edge mask 24 defining a U-shaped groove, but other groove configurations may be obtained. To provide strength for larger driver heads, but not necessarily needed for fairway woods, structural support bars 32 extend from one side of recess 28, to another side of recess 28, through crown opening 26. In the preferred embodiment, support bars 32 are of an X shape having an intersecting point 34. Also in the preferred embodiment, support bars 32 are perforated, further limiting the weight of the support bars enabling the center of gravity of the metalwood to be further lowered.

As shown in Figure 2, cover 11 is positioned onto primary head component 10 in a manner which covers crown opening 26. Preferably, cover 11 fits in recess 28. Cover 11 is of a material which is distinct from the material utilized for primary body 10 and which is unsuitable for welding with primary body 10. Preferably cover 11 is non-metallic when primary body 10 is metallic and preferably is of fiber reinforced resin material such as metallic fiber, glass fiber, ceramic base fiber, organic base fiber, alumina fiber, boron fiber, titanium potassium fiber, carbon fiber, and/or fiber composed of these mixtures may be used. Particularly, carbon fiber is preferable to reduce the weight of the golf club. Of course, the invention considers that the primary body may be metal such as titanium and the cover may be another metal such as magnesium or the primary body may be ceramic or reinforced plastic and the cover metallic. In each of these circumstances, the cover is not suitable for welding to the primary body.

As shown in Figures 2 and 3, reinforcing edge mask 24 is utilized for integrating cover 11 with primary body head 10. Reinforcing edge mask 24 may either be metallic or fiber reinforced resin material. As shown in the preferred embodiment, when the primary body is metal, the reinforcing edge mask may preferably be composed of a plurality of individual joint member elements 24a, 24b and 24c which each have the reinforcing fiber extending outward from a central radius for added strength, and are integrated together in a configuration suitable for being received in intermediary crown portion 30. In the preferred embodiment, reinforcing edge mask 24 consists of several layers of elements 24a, 24b and 24c, which are stacked upon each other. In the preferred embodiment, intermediary crown portion 30 extends around the periphery of cover 11, and reinforcing edge mask 24 extends over the periphery of cover 11, and is received by intermediary crown portion 30. However as most of the force exhibited onto cover 11 stems from the impact of the face of the metalwood, it is not necessary to completely

envelope cover 11 by reinforcing edge mask 24. Preferably reinforcing edge mask 24 is stronger than composite cover 11. Also, reinforcing edge mask may be metallic. The focus of reinforcing edge mask is to facilitate the bond between the materials of the crown and cover which are unsuitable for bonding.

As shown in Figure 4, reinforcing edge mask 24 interconnects cover 11 with primary body 10. Preferably, an adhesive agent 36 is applied to both cover 11, and primary body 10, prior to reinforcing edge mask 24 being seated on top of primary body 10 and cover 11. In effect, reinforcing edge mask 24 functions as a reinforcing component of cover 11, by absorbing most of the forces transmitted by the face of the metalwood upon impact with a golf balls. This enables cover 11 to maintain its initial position within seat 28. The specific aspects of reinforcing edge mask 24 are discussed in the parent application entitled Golf Club Head and Manufacturing Method Thereof, having inventors Kenji Onoda, Katsuyuki Aizawa and Philip Chuang, which claimed priority from Japanese patent application 2002-349443 filed December 2, 2002 and which was filed in the United States on December 2, 2003. The parent application is attached as Appendix A and is incorporated by reference. In the preferred embodiment, adhesive agents are utilized for additionally securing cover 11 within recess 28.

As shown in Figures 1 and 5, to further assist in moving the center of gravity towards the shaft axis, corrugated detents 50 and 52 are formed within the primary body 10 on the hosel side of the body. These corrugated detents enable more weight to be applied towards the shaft axis in an efficient manner. In the preferred embodiment, corrugated detents 50 and 52 do not extend past the midline of the golf club head, but such configuration is adjustable depending on the overall weight distribution of the club head.

As shown in Figures 5 and 7, a further improvement to a metalwood includes defining a recess 40 within the toe portion of the metalwood and inserting a composite toe component 42 within the recess. The insertion of a composite toe component removes weight from the toe portion enabling the center of gravity to be moved closer to the shaft axis.

As shown in Figures 6 and 7, a further improvement to a metalwood includes chamfering the toe portion between the sole and the crown of the metalwood. The chamfered toe portion 44 removes weight from the toe enabling the center of gravity of the metalwood to be moved closer to the shaft axis.

In operation, the utilization of a composite component within the metallic primary body enables weight to be removed from the club head enabling a larger club head to be made while still maintaining an approximate weight of two hundred grams. The removal of weight from the crown of the club head lowers the center of gravity of the club head. The addition of a reinforcing edge mask maintains the integrity of the bonding of the non-metallic composite cover with the metallic club head. Further advances are achieved via the utilization of support bars, chamfered toe portion and a composite toe portion. Each of these advances may be combined or utilized individually depending upon the desired attributes of the metalwood.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and once the innovative features of the invention are known, it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.